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ABSTRACT

This study explores the relationship between children's metalinguistic awareness of aural word boundaries and their reading achievement and was designed to answer the following questions: (1) Does a child's knowledge of spoken word boundaries improve with age? (2) What is the relationship between children's conceptions of spoken words and their reading achievement? The sample consisted of 65 children, selected in a nonrandom fashion from kindergarten, first-grade, second-grade, or third-grade classrooms at an elementary school. The children's knowledge of spoken words was assessed in April 1975. Reading-achievement levels were assigned according to the basal materials that the children were reading in April 1976. Two pretraining tasks were used to help the child learn the rules of a "yes/no" game. For the study proper, the child was instructed to listen to an audiotape and to respond "yes" if he or she heard one word and "no" if he or she did not hear one word. The data was analyzed, and it was found that the average child's metalinguistic awareness of a spoken word improves with age and that there is a significant relationship between children's metalinguistic awareness of spoken words and their reading achievement. (LL)

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Relationships Between Metalinguistic Awareness and Reading Achievement

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Downing (1976) uses the term "reading register" to describe the special terminology that is used to teach reading. Children being taught to read are frequently bombarded with words in the reading register: letter, sound, syllable, word, phrase, and sentence. The term "metalinguistic awareness" (Cazden, 1972) may be used to describe the child's ability to understand the reading register.

The lack of metalinguistic awareness may be partially responsible for the cognitive confusion (Vernon, 1957) that exists among children trying to make sense of reading instruction. A child, for example, who is unable to recognize a spoken word as different from a sound or syllable may experience difficulty in reading. Metalinguistic awareness of the reading register develops unevenly among children and may influence a child's learning to read and subsequent reading progress.

Aural awareness of word boundaries has been the focus of numerous investigations (Downing, 1972; Evans, 1974; Holden and MacGinitie, 1972; Huttenlocher, 1964; Karpova, 1966). The evidence from these studies seem to indicate that the young child's perception of speech segments does not coincide with his/her awareness of the units "word" and "sound". Fox and Routh (1975) found that 4 year old children generally had the ability to repeat spoken sentences and then divide the sentences into words, the words into syllables, and the syllables into phonemes. This process occured at younger ages than reported by Bruce (1964), Holden and MacGinitie (1972), and Rosner (1974).

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As part of his investigation, McNinch (1974) explored whether awareness of aural word boundaries was related to performance on a reading achievement test. He found that correct perception of aural words was a significant predictor of reading achievement and concluded that aural perceptions of word boundaries may merit consideration as a prerequisite for learning to read.

The present study was undertaken to further explore the relationship between children's metalinguistic awareness of aural word boundaries and reading achievement. The study was designed to answer the following questions: 1) does a child's knowledge of spoken word boundaries improve with age?; and 2) what is the relationship between children's conceptions of spoken words and their reading achievement?

Method

Subjects

The sample consisted of nine boys and nine girls in the 5.6-6.5 age range; ten boys and ten girls in the 6.6-8.0 age range; and 14 boys and 13 girls in the 8.1-9.5 age range. These 65 children were selected in a non-random fashion from 120 children who were involved in a previous investigation (Johns, in press). The children were from kindergarten, first, second, or third grade classrooms at Littlejohn Elementary School in DeKalb, Illinois. All of the children were white; teachers identified the socioeconomic status of the children as middle-class.

Procedure

The children's knowledge of spoken words was assessed in April, 1975. Reading achievement levels were assigned according to the basal materials that the children were reading in April, 1976. These graded materials ranged in difficulty from the pre-primer level to the fifth-grade level.

The procedures used in this investigation paralleled those employed in the Downing-Oliver (1973-1974) study. Two pretraining tasks were used to help the child learn the rules of a "yes-no" game. The first pretraining task was visual and involved presenting the child with a series of pictures of familiar objects. Before the pictures were shown, the following directions were read to the child: "We are going to play a 'yes-no' game. I will show you some pictures. I want you to say 'yes' if there is one dog in the picture. You should say 'no' if there is no dog or more than one dog in the picture. Do you understand?" (If the child did not understand, the directions were repeated.) The five pictures were randomly ordered for each child and presented as many times as necessary for the child to respond correctly to all of the pictures.

The second pretraining task was auditory and consisted of presenting the child with a series of sounds (for example, sounds made by blowing into a bottle or two pieces of wood banging together). The following directions were read to the child: "This time we will play the 'yes-no' game by listening to sounds. You will listen to a sound on the tape recorder. If you hear one bottle sound you should say 'yes.' If you do not hear one bottle sound you should say 'no.' Do you understand?" (The directions were repeated if necessary.) Any child who was unable to complete both of the pretraining tasks successfully was not included as a study participant.

For the study proper, the following directions were read to the child: "This is the last game we are going to play. This game is a little bit longer. This time the 'yes-no' game will be listening for a word. You will listen for a word on the tape recorder. You should say 'yes' if you hear one word. You should say 'no' if you do not hear one word. Do you understand?" (The directions were repeated if necessary.)

The test stimuli consisted of five examples in each of eight different classes of auditory stimuli. All the stimuli were from the Downing-Oliver study. Table 1 contains the eight classes of auditory stimuli and one example from each stimulus class. The 40 stimuli were recorded by a female adult on audio-tape in four different random orders. Each child in the study was randomly assigned to one of the audio-tapes.

Results and Discussion

Results from the investigation were first compared in terms of the mean number of correct responses made by boys and girls at each age level for each of the eight auditory stimulus classes. A correct response was "yes" when either a long or a short word was presented and "no" when any of the remaining six classes of stimuli was presented. The mean numbers of correct responses to each stimulus class given by each sex at the various age levels are presented in Table 2.

A visual inspection of the data reveals some clear developmental trends in the stimulus classes. This finding is due to the two youngest age groups. Their responses were quite similar except for the following stimulus classes: short words, long words, phrases, and sentences. Children in the 6.6-8.0 age range performed better than the younger children in each of the stimulus classes except "long words." The tendency for children between the ages of 6.6 and 8.0 to exclude long words from their concept of a spoken word may be explained by the fact that these children were receiving formal reading instruction for the first time. Perhaps they view words as the "short things" that appear in their basal readers. Downing and Oliver (1973-1974) found a similar occurence with children who were being introduced to reading. Meltzer and Herse (1969) also reported a similar

finding regarding children's conceptions of written words. The children in the 5.6-6.5 age group, who had higher mean scores for long words, were in kindergarten and had not yet been formally introduced to reading. Thus, it would appear that classroom reading instruction may have some influence on children's metalinguistic awareness of what constitutes a word.

By the time that children were 8.1-9.5 years old, their performance in all stimulus classes was consistently higher than the performance of children in the 6.6-8.0 age group. There were, however, two stimulus classes where all the children performed poorly: phonemes and syllables. Children hearing an isolated phoneme or syllable might assume that it is a word not in their meaning vocabularies. One could, therefore, question the use of such stimuli when attempting to assess a child's metalinguistic awareness of a spoken word.

By the time that children were in second or third grade (8.1-9.5), their concept of a word was generally good if responses to phonemes and syllables are not considered. This finding, however, should be interpreted with caution. A considerable range of individual differences was evident when the data were analyzed in terms of the number of children who consistently knew whether a particular class of stimuli was a "word" or not.

A child was classified as having the correct concept of a word if he/she responded "yes" to all five presentations of both long and short words and if he/she responded "no" to all presentations of stimuli that were not words. Although this criterion of five out of five (or conversely, zero out of five) may seem stringent, Downing and Oliver (p. 576) note that "...this combination can be attained by chance only three times out of 100 as calculated by a one-tailed binomial test. The probability of obtaining four 'yes' responses out of five by chance alone is 0.16, which was deemed too high a probability

in terms of committing a type I error (stating that the child had the concept when, in fact, he did not)."

Using the above criterion, the number and percent of boys and girls within each age group who demonstrated knowledge of the concept represented by each class of stimuli is presented in Table 3. Visual inspection of the data revealed that few children in any of the age groups consistently recognized that isolated phonemes and syllables were not words. Because of the nature of the stimuli, the significance of this finding remains unclear.

Children in the 5.6-6.5 age group demonstrated considerable confusion when asked to identify spoken words. Only 44 percent of these children were consistently able to identify short words; only 28 percent were consistently able to recognize long words. The vast differences between boys' and girls' responses to words in these two stimulus classes may help explain sex differences in reading achievement. Inasmuch as these children will be introduced to formal reading instruction within six months, one begins to sense the cognitive confusion that may exist, especially among the 9 boys in this age group.

Fortunately, by the end of the first year of formal reading instruction (age group 6.6-8.0), both boys and girls appear to possess an accurate concept of a short word. Confusion still exists, however, for long words; only 10 percent of the students responded correctly to all the long words used as stimuli.

By the time children reached second or third grade (8.1-9.5), at least 70 percent were consistently able to distinguish non-verbal abstract (85%), non-verbal real-life (70%), phrases (88%), and sentences (100%) from a word. Only 33 percent of the children, however, were consistently able to recognize

long words as words. It appears that many students continue to experience cognitive confusion of spoken words through the primary grades.

The relationship between children's concepts of words and their reading achievement was determined with Pearson product-moment correlations. Table 4 contains the correlation coefficients for each age group using mean stimuli scores and concept scores. For the total group, all correlations were significantly different from zero. For children aged 5.6-6.5 there was a significant relationship between their concept scores and reading achievement. This correlation (.60) is higher than the median r (.50) between intelligence and reading as reported in the studies of first-grade reading (Bond and Dykstra, 1967); nevertheless, the reading achievement of individual children could not be predicted accurately using concept scores.

The correlation coefficients for the two younger age groups indicated that there is a relationship between children's metalinguistic awareness of words and their reading achievement. The magnitude of these correlation coefficients is encouraging. Perhaps future research can explore this relationship further using larger numbers of students and refined techniques for assessing selected aspects of the reading register.

Limitations

As noted by Downing and Oliver, the stimuli and their method of presentation have no established validity or reliability. Also, whether the use of other stimuli within each stimulus class would produce similar or different results is unknown.

The 65 children in this investigation were from one socioeconomic class and a particular geographic area. As such, the results are limited to middle-class children in the Northern Illinois University area. Since the results tend to support the findings from previous research, however,

there is reason to believe that the findings can be generalized to similar children throughout English-speaking areas and nations.

Summary

One of the most significant contributions of this study is the finding that the average child's metalinguistic awareness of a spoken word improves with age. Unfortunately, young children soon to be introduced to reading appear to be in a state of cognitive confusion. Over 50 percent of these children consistently failed to recognize a spoken word as a word. Although children's metalinguistic awareness improves by the time they reach second or third grade, an occasional child will still identify the sound of a dog barking or "mother and father" as a word. Even more children will demonstrate uncertainty as to whether a phoneme or a syllable is a spoken word. Inasmuch as this study reported significant relationships between children's metalinguistic awareness of spoken words and reading achievement, there is reason to believe that future investigations into the reading register may shed more light on the cognitive confusion that children exhibit in the early years of reading instruction.

Table 1

Examples of Specific Stimuli Within Each Class of Auditory Stimulus

Stimulus Class	Example
1. Non-Verbal Abstract	Hissing sound
2. Non-Verbal Real-Life	Person coughing
3. Isolated Phonemes	/a/[a]
4. Isolated Syllables	/trou/[a]
5. Short Words	Fire
6. Long Words	Automobile
7. Phrases	Big bad wolf
8. Sentences	They went to the zoo.

[a]Shown in the symbols of the International Phonetic Alphabet

Table 2

Mean Number of Correct Responses for Each Class of Auditory Stimulus by Boys and Girls in Three Age Groups

Stimulus Class	Sex	Chronological Age Group		
		5.6-6.5 (n=18)	6.6-8.0 (n=20)	8.1-9.5 (n=27)
Non-Verbal Abstract	Boys	2.67	3.40	4.71
	Girls	3.11	3.10	4.69
	Total	2.89	3.25	4.70
Non-Verbal Real-Life	Boys	2.78	2.90	4.43
	Girls	3.33	3.10	4.31
	Total	3.06	3.00	4.37
Phonemes	Boys	0.78	1.00	2.36
	Girls	1.56	1.10	2.23
	Total	1.17	1.05	2.30
Syllables	Boys	2.11	1.00	2.43
	Girls	0.78	1.50	2.69
	Total	1.44	1.25	2.56
Short Words	Boys	2.78	4.50	4.86
	Girls	4.78	4.90	5.00
	Total	3.78	4.70	4.93
Long Words	Boys	2.22	1.60	3.93
	Girls	3.44	2.90	4.16
	Total	2.93	2.25	4.04
Phrases	Boys	3.67	5.00	5.00
	Girls	3.11	4.40	4.77
	Total	3.39	4.70	4.89
Sentences	Boys	3.67	5.00	5.00
	Girls	2.89	4.50	5.00
	Total	3.28	4.75	5.00

Table 3

Number and Percent of Boys and Girls Within Each Group Demonstrating Concept Attainment for Each Class of Auditory Stimulus

Stimulus Class	Sex	Chronological Age Group					
		5.6-6.5		6.6-8.0		8.1-9.5	
		n	%	n	%	n	%
Non-Verbal Abstract	Boys	1	11	4	40	13	93
	Girls	4	44	5	50	10	77
	Total	5	28	9	45	23	85
Non-Verbal Real-Life	Boys	1	11	3	30	10	71
	Girls	1	11	3	30	9	69
	Total	2	11	6	30	19	70
Phonemes	Boys	0	0	0	0	2	14
	Girls	0	0	0	0	1	8
	Total	0	0	0	0	3	11
Syllables	Boys	0	0	0	0	1	7
	Girls	0	0	1	10	2	15
	Total	0	0	1	5	3	11
Short Words	Boys	1	11	9	90	12	86
	Girls	7	78	10	100	13	100
	Total	8	44	19	95	25	93
Long Words	Boys	1	11	0	0	4	29
	Girls	4	44	2	20	5	38
	Total	5	28	2	10	9	33
Phrases	Boys	3	33	10	100	14	100
	Girls	2	22	8	80	10	77
	Total	5	28	18	90	24	88
Sentences	Boys	3	33	10	100	14	100
	Girls	4	44	9	90	13	100
	Total	7	39	19	95	27	100

Table 4

Correlations Between Reading Achievement and Stimuli Scores and Concept Attainment Scores for Boys and Girls in Three Age Groups

Age Group	Sex	n	Stimuli	Concepts
5.6-6.5	Boys	9	.51	.58
	Girls	9	-.06	.46
	Total	18	.19	.60**
6.6-8.0	Boys	10	.18	.46
	Girls	10	.83**	.83**
	Total	20	.52*	.64**
8.1-9.5	Boys	14	.18	-.11
	Girls	13	.49	.37
	Total	27	.33	.18
All Age Groups	Boys	33	.78***	.77***
	Girls	32	.66***	.70***
	Total	65	.72***	74***

*$p < .05$
**$p < .01$
***$p < .001$

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